Budapest University of Technology and Economics

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BME in figures

1782 – Institutum Geometricum – Hydrotechnicum established by Emperor Joseph II
1860 – Hungarian replaces Latin
1925 – First women students enroll
1949 – Technical University of Budapest
2000 – Budapest University of Technology and Economics (BME)

- 70 departments
- 8 faculties
- 23,000 students, 2,200 international students (2019/20)
- 1,300 academic staff (800 with PhD/DLA)

Faculties


Faculty of Civil Engineering (1782)


Faculty of Mechanical Engineering (1871)


Faculty of Architecture (1873)


Faculty of Chemical Technology and Biotechnology (1873)


Faculty of Electrical Engineering and Informatics (1949)


Faculty of Transportation Engineering and Vehicle Engineering (1951)


Faculty of Natural Sciences (1998)


Faculty of Economic and Social Sciences (1998)

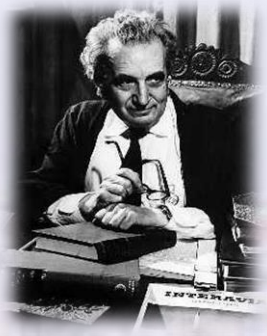
Nobel laureates graduated from BME

Dénes (Denise) GÁBOR (1900 – 1979)
holography, in 1971

Jenő (Eugene) WIGNER (1902 – 1995)
theoretical physics, in 1963

György (George) OLÁH (1927– 2017)
organic chemistry, in 1994

World famous alumni



Theodore von KÁRMÁN
Aeronautics & Mathematics
(1881–1963)

Leo SZILÁRD
Physicist
(1898–1964)

Donát BÁNKI
carburetor
(1859 – 1922)

Ede TELLER
Physicist
(1908– 2004)

Károly ZIPERNOWSKY
transformer
(1853–1942)

Ernő Rubik

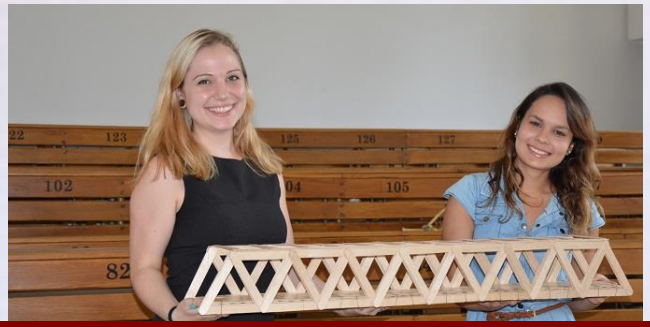
(1944–)

Mission

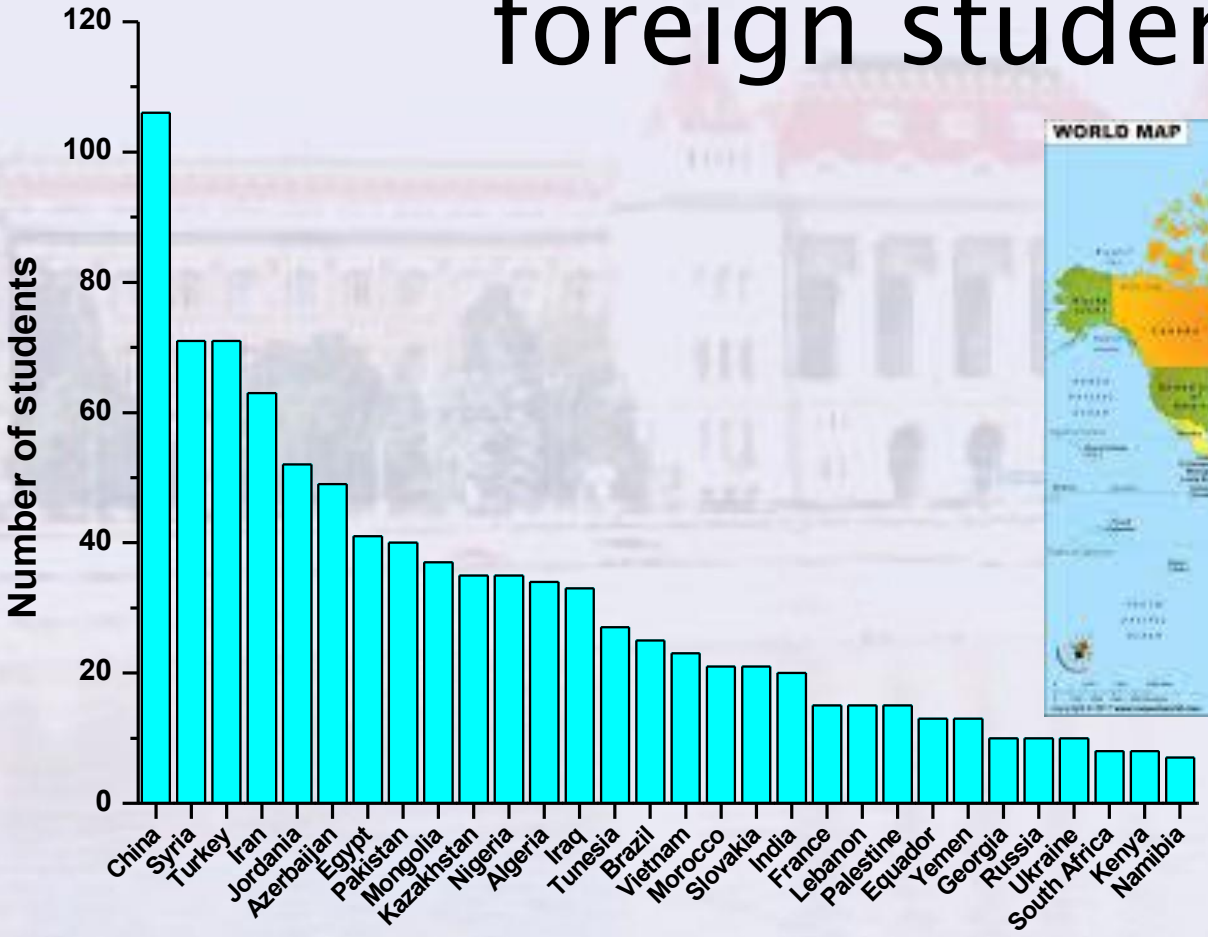
- Sound, **practice-oriented BSc**
- **Innovational MSc**
- PhD: **Problem-driven, knowledge-oriented research**
- World-class, research-based education
- Rigorous academic study & practical skills
- Tackle future challenges
- Symbiosis of science, innovation and technology
- Serving the society

Education at BME

- Engineering education in general:
  - 7–8 semester BSc programs (210–240 credits)
  - 3–4 semester MSc programs (90–120 credits)
- PhD Programs in 13 doctoral schools (2+2 years)
- Full BSc, MSc and PhD curricula both in Hungarian and English
- Continuing Engineering Education, postgraduate courses, MBA, etc.



Geographical distribution of foreign students



bkiss@iit.bme.hu

http://www.bme.hu
http://www.ff.bme.hu

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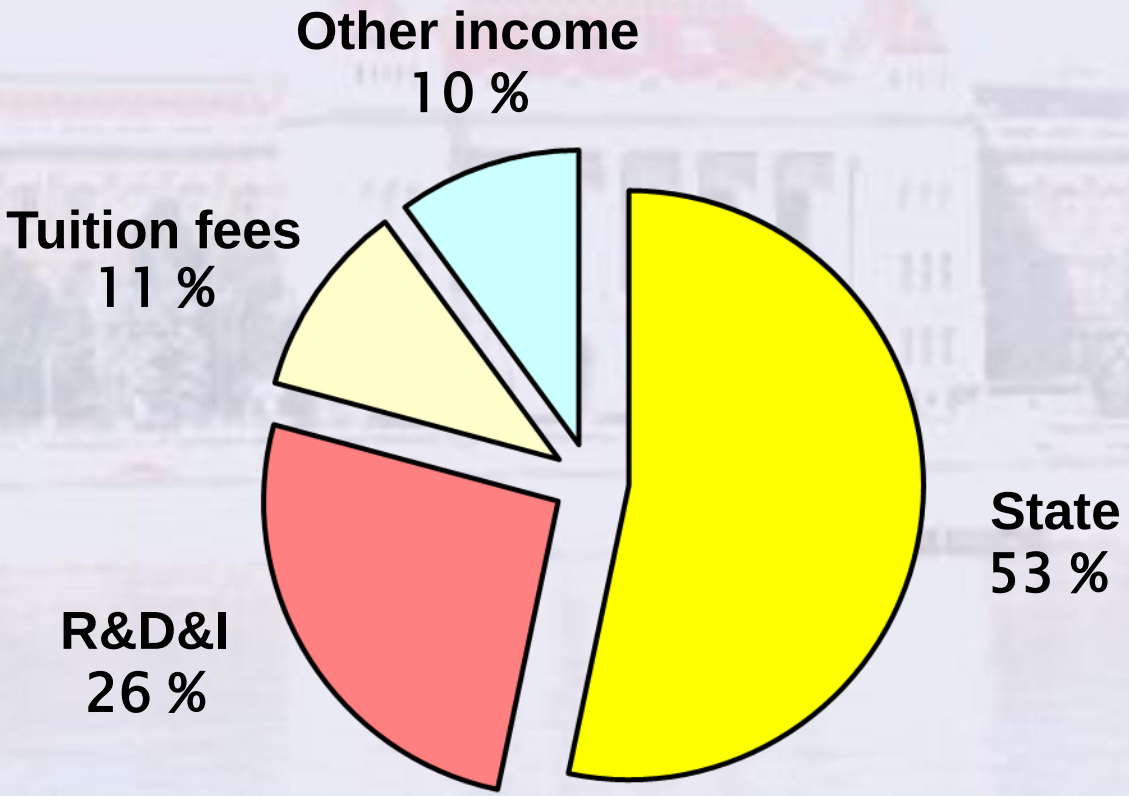
Budget



Academic Ranking of World Universities – ARWU 2019 rank 801–900

- Faculty of Mechanical Engineering (201-300)
- Civil Engineering (201-300)
- Faculty of Natural Sciences – Mathematics (301-400)
- Chemical Engineering (401-500)
- Chemistry (401-500)
- Pharmacy & Pharmaceutical Sciences (Medical Sciences) (401-500)

QS World Ranking 2019

- Emerging Europe and Central Asia: 29.

- QS main ranking (BME 801-1000)
  - Engineering - Mechanical, Aeronautical & Manufacturing (351-400)
  - Material Science (351-400)
  - Chemistry (351-400)

International outreach (sel.)

ATHENS (Advanced Technology Higher Education Network / Socrates) . 14 leading European universities

AUF (Agence Universitaire de la Francophonie)

CEEPUS (Central European Exchange Program for University Studies)

CELSA (Central Europe – Leuven Scientific Allience)

CESAER (Conf. of European Schools of Advanced Engineering Education and Research)

CRP (Conference of Rectors/Presidents of European Techn. Universities)

Erasmus (1-2 semesters)

EUA (European University Association)

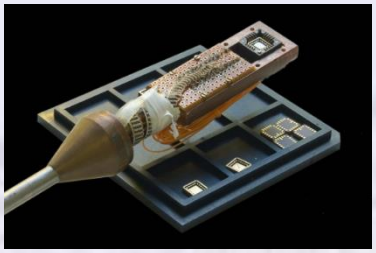
EAIE (European Association for International Education)

SEFI (European Society for Engineering Education)

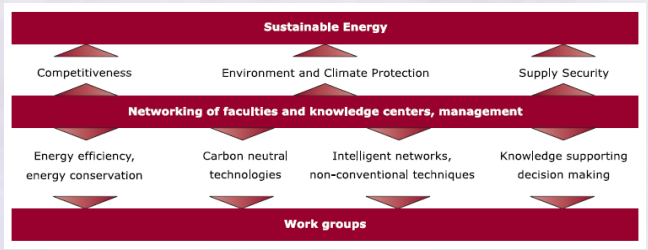
T.I.M.E. Network of 54 leading universities of technology. Double diplomas, doctorate cooperation, summer schools etc.

4TU League (Regional cooperation of BME, CTU, SUT and TU Wien)

BME as a research university – strategic research areas



- Artificial Intelligence, smart cities, robotics
- Intelligent environment and e-technologies
- Sustainable energy
- Vehicle technology, autonomous driving, transportation and logistics
- Biotechnology, health and environment protection
- Nanophysics, nanotechnology and materials science
- Disaster prevention: modern engineering methods



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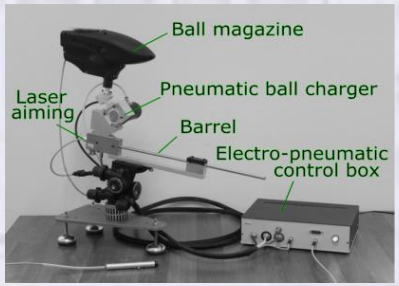
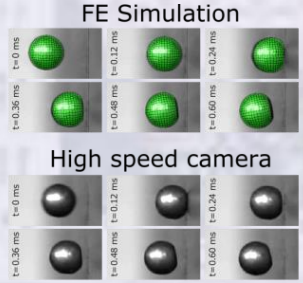
ProExcer – ERC Proof of Concept Grant

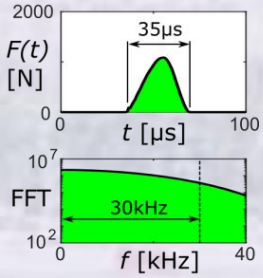
Projectile exciter for noiseless environment

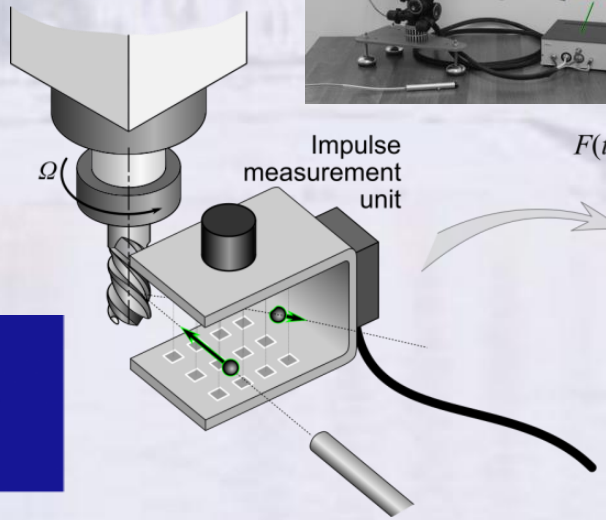
PI: Prof Gábor Stépán
01/19 – 07/20
150 kEUR

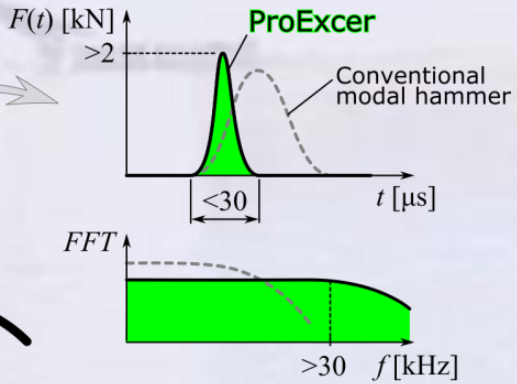
*A SIREN PoC











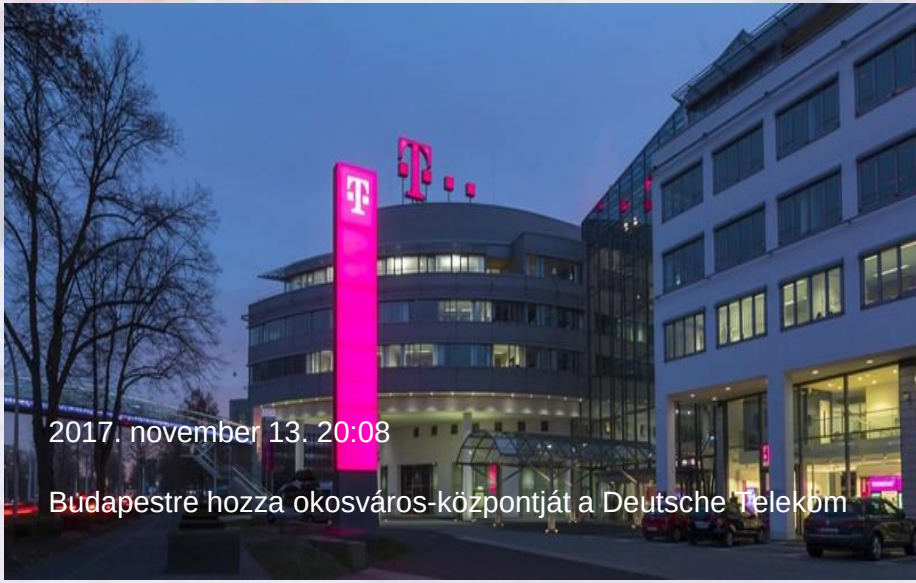
European Research Council erc

Innovation and collaboration in AI

Autonomous driving

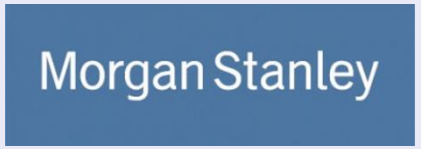
- Daimler
- Volkswagen
- Volvo
- Audi Hungária Motor
- Bosch
- Knorr-Bremse
- Haldex
- Continental

Smart cities



- Ericsson
- Nokia
- Huawei
- MVM
- GE

International collaborations



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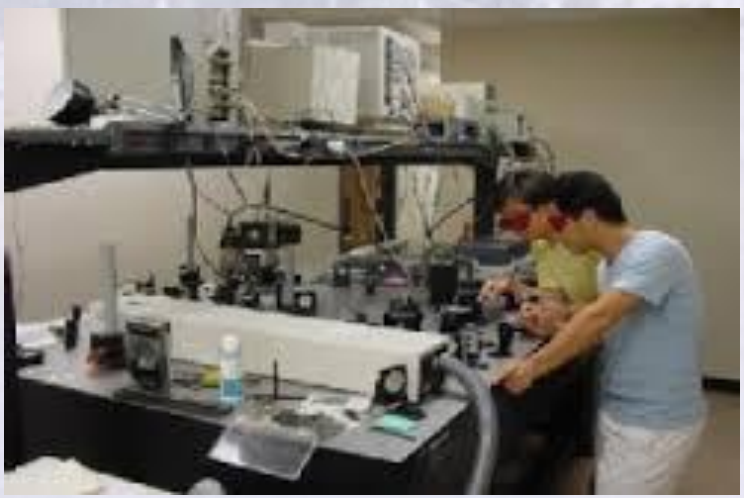
Infrastructure



Industrial labs at university premises

Ericsson High Speed Net Lab

Nokia Traffic Lab

BME Morgan Stanley Financial Innovation Lab

- Industrial research carried at the university: participation in cutting edge R&) activities
- HR objectives for the company: talented students (talents proven by the project involvement) after the degree are getting employed

Path to successful innovation – BME Higher Education and Industrial Collaboration Center

Scope: Integrated intelligent technologies in ICT, pharmaceutical industry, electric drives, energy sector

mvm

SIEMENS

MŰEGYETEM 1782

RICHTER GEDEON

NOKIA

Tasks:

- Streamlining innovation
- Efficient coordination of university and industrial R&D
- New sources for funding R&D
- New "digital ecosystem" for industrial processes

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BME in FP 7 projects

Year (and number of projects)	EU contribution in Euro
2007 – 18 projects	3 919 585
2008 – 16 projects	1 789 173
2009 – 16 projects	2 857 047
2010 – 17 projects	4 376 324
2011 – 16 projects	2 714 751
2012 – 12 projects	1 760 579
2013 – 14 – projects	4 707 434
Total – 109 projects	**22 285 893**
Average project size	**200 000**

BME in projects

EU

FP-7 2007-2014	109 (ave 200.000 €)
Horizon 2020	61 (vs. 48 FP7 in the same timescale)

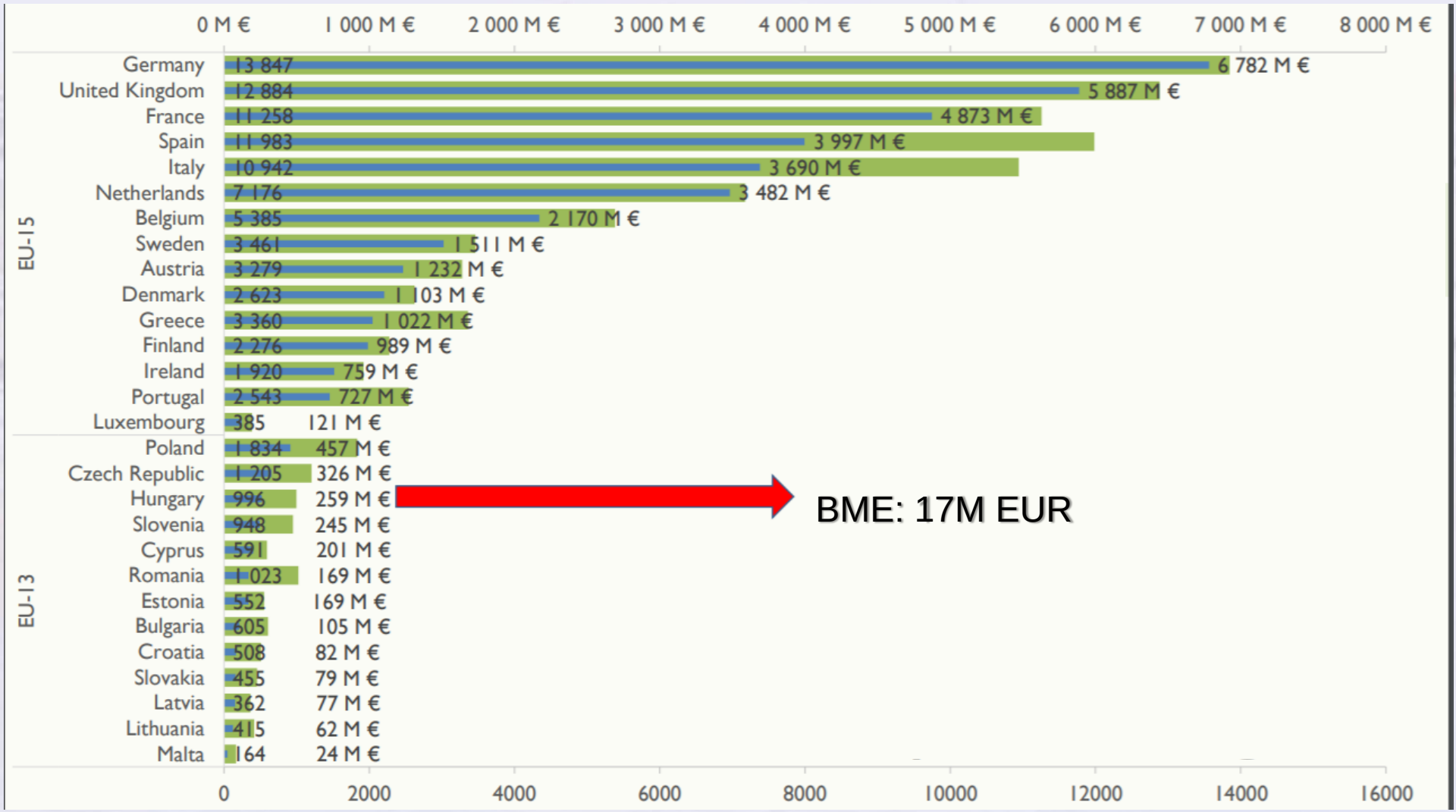
National

VEKOP

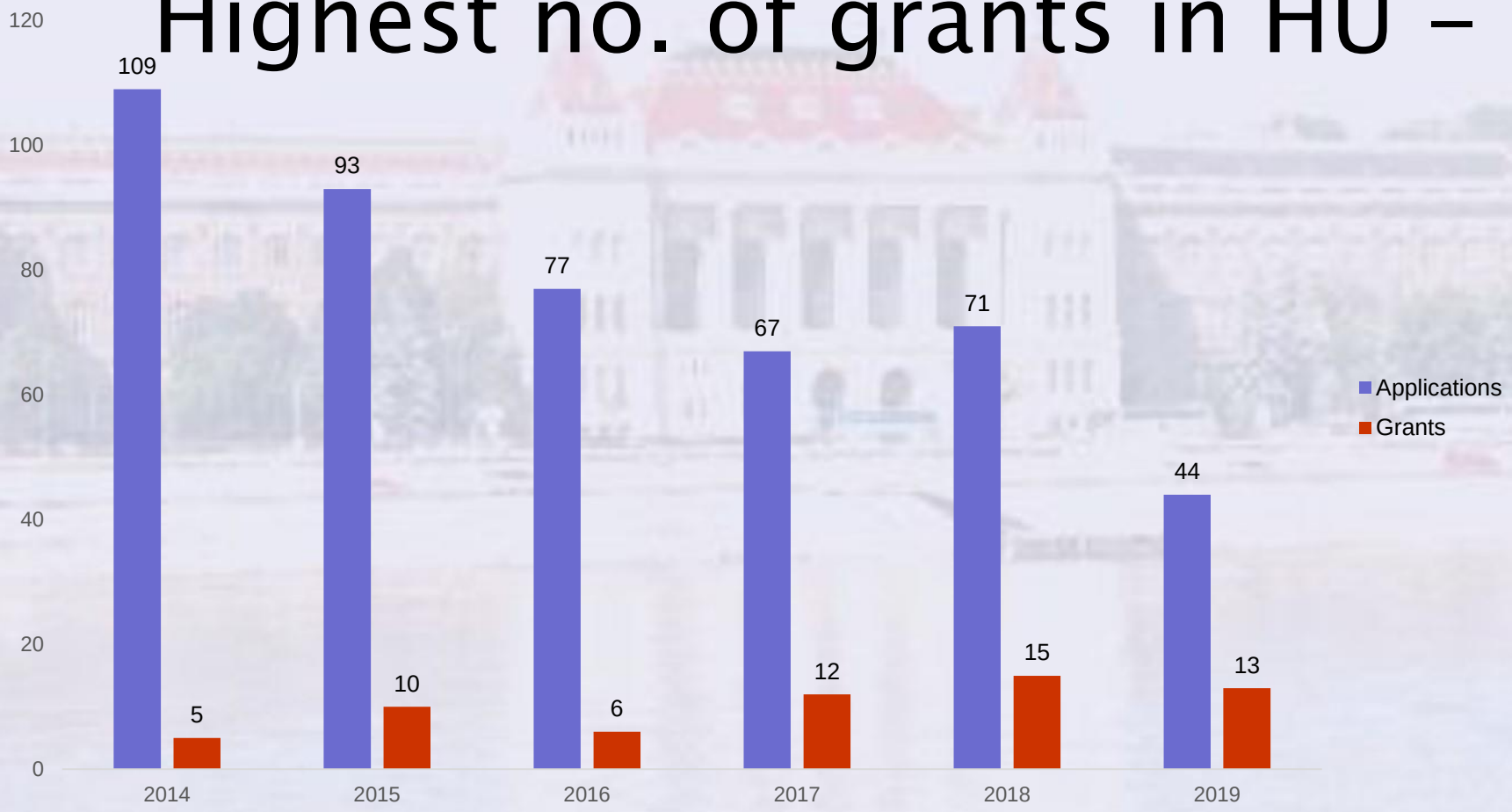
National Excellence Programmes

OTKA

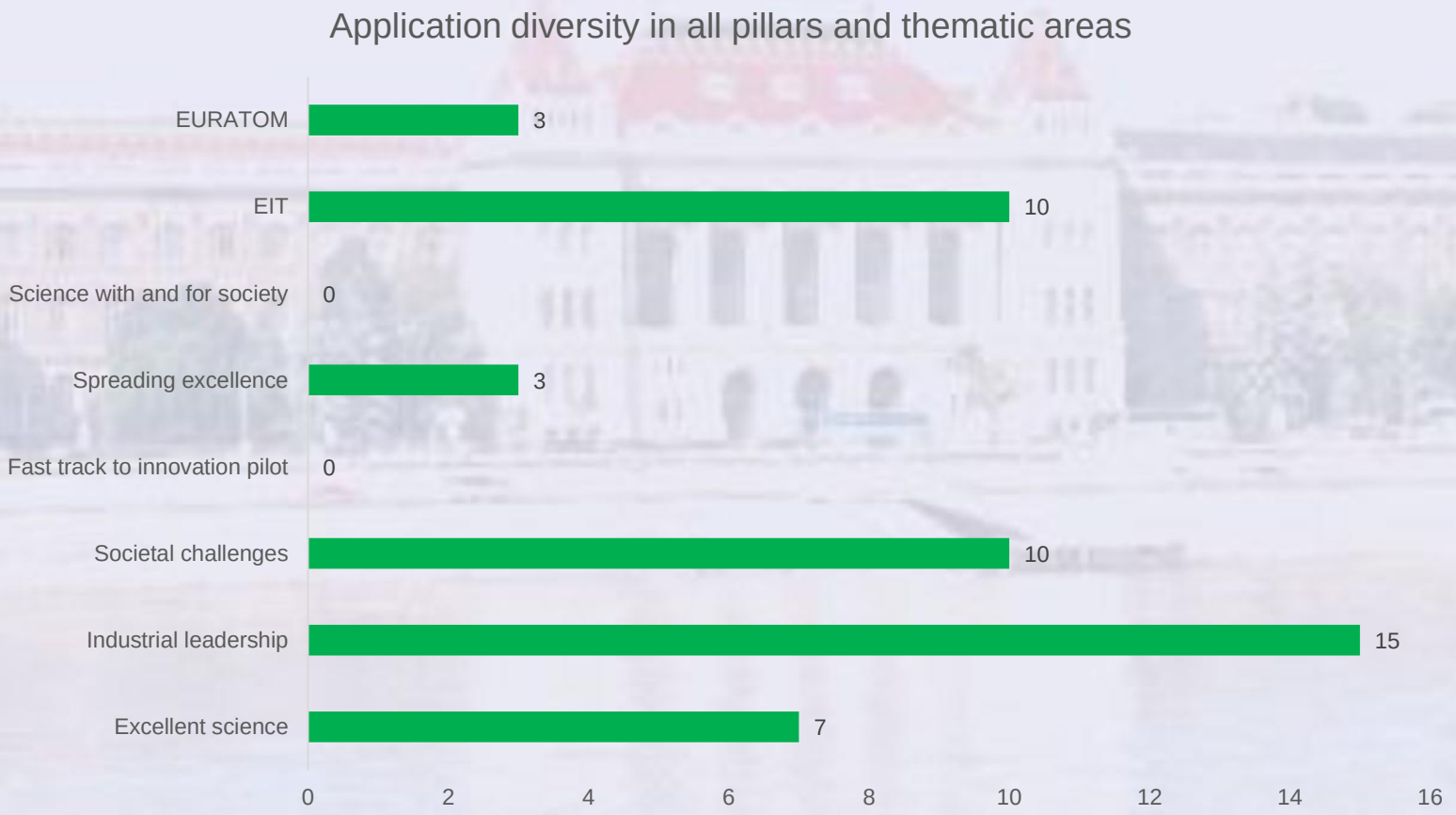
Hungary in H2020



BME in H2020
Highest no. of grants in HU – 61



BME grants in H2020



ANIMA - Aviation Noise Impact Management

- Duration: 1 Oct 2017 – 30 Sep 2021
- 22 partners from 11 countries
- Budget: Overall: 7.4 M €, BME: 307k €
- aim: improving quality of life of people living in airport regions
  - identify best practices: literature -> web-portal
  - pilot studies on the effect of interventions influencing non-acoustical factors
  - tool-development

ANIMA
Aviation Noise Impact Management through Novel Approaches

ONERA THE FRENCH AEROSPACE LAB
Manchester Metropolitan University
nlr Dedicated to innovation in aerospace
ARC AIRPORT REGIONS CONFERENCE
SAFRAN
AIRBUS
anotec engineering
MŰEGYETEM 1782
DLR Deutsches Zentrum für Luft- und Raumfahrt German Aerospace Center
e environnons
Erdyn Engaging Innovation
Heathrow Making every journey better

COMOTI ROMANIAN RESEARCH & DEVELOPMENT INSTITUTE FOR GAS TURBINES
NIJZ Nacionalni inštitut za javno zdravje
University of Southampton Institute of Sound and Vibration Research
Iasi Airport
Schiphol Group
CATAPULT Transport Systems
ROMA TRE UNIVERSITÀ DEGLI STUDI
UNIVERSITÉ de Cergy-Pontoise
ZEUS GmbH

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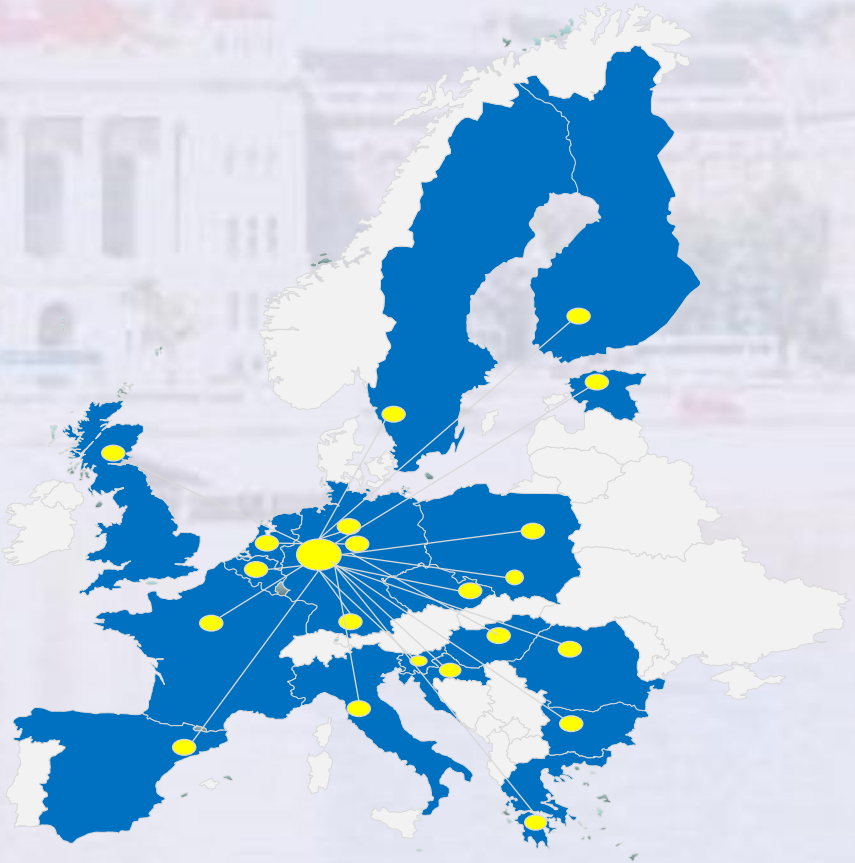
TETRAMAX -Technology TRAnsfer via Multinational Application eXperiments

- Innovation Action from EU H2020 ICT-04-2017 call
- Thematic focus: customized and low-energy computing
- Total budget: 7M €
- BME budget: 140k €
- Duration: Sep 2017 – Aug 2021
- 23 partners covering
  - almost all EU countries
  - complementary expertise (technologies, networking, business generation)



S4E: Smart4Europe - Coordination and Support Action

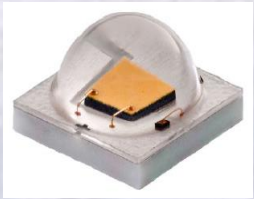
INNOVATION PORTAL – CENTRAL CONTACT POINT – SERVICE CENTRE – MARKET PLACE

in order to

- share **Best Practice** and **Experience**
- facilitate **Brokerage**
- coordinate **Communication & Dissemination**
- leverage **Investment** and stimulate **Growth**
- identify new **Technologies**
- link to other **Digitisation Initiatives**

Delphi4LED

- **H2020 ECSEL project of the EU** (2016-2019)
- Title: **From Measurements to Standardized Multi-Domain Compact Models of LEDs**



- The consortium:
  - **Philips Lighting / Signify**,
  - Flexbright, Magillem Design, Ingélux, PISEO, Philips France / Signify, Ecce'Lectro, Felio Sylvania, PI-Lighting
  - Mentor – a Siemens business
  - **BME**, TUe, VTT
- BME leading the modelling activities within the proje
- BME budget: 270k €

Robotic solutions for SMEs - TRINITY
Department of Mechatronics, Optics and Engineering Informatics

Running H2020 project in Department of Manufacturing Science and Engineering

EPIC CoE - Centre of Excellence in Production Informatics and Control
2017 – 2024

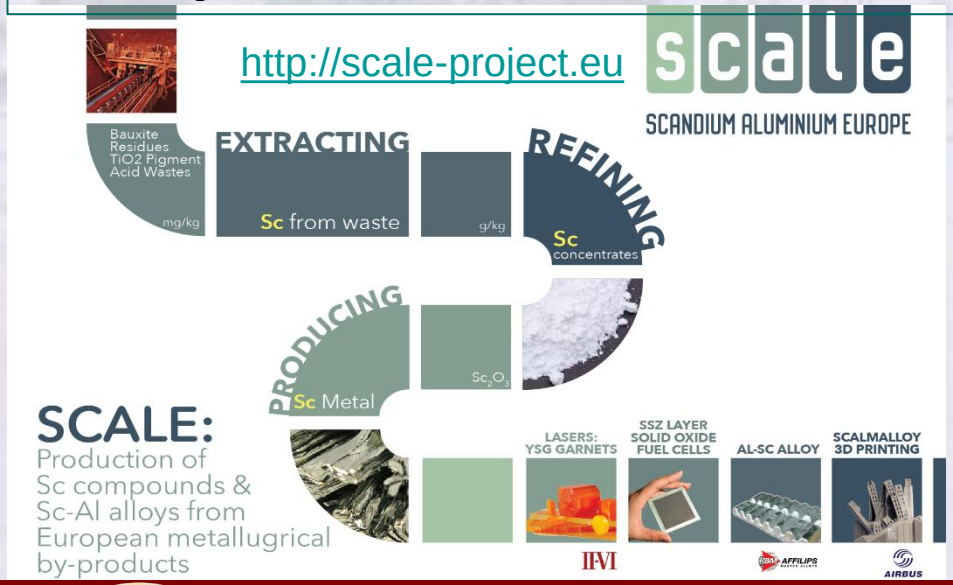
Objectives: - centre of knowledge related to Cyber-Physical Production (CPP).
- Accelerating innovation
- Realizing industrial solution
- Training highly qualified professionals
- Supporting sustainable and competitive EU manufacturing ecosystem

PROGRAMS - Prognostics based Reliability Analysis for Maintenance Scheduling
2017 – 2020

Objectives: - developing model-based prognostics method **integrating the FMECA and PRM approaches** for the smart prediction of equipment condition
- a **novel MDSS tool** for smart industries maintenance strategy determination and resource management integrating ERP support
- introduction of an **MSP tool** to share information between involved personnel.

„SCALE” - PRODUCTION OF SCANDIUM COMPOUNDS AND SCANDIUM ALUMINUM ALLOYS FROM EUROPEAN METALLURGICAL BY- PRODUCTS

EU Research and Innovation programme H2020-EU.3.5.3
Identification number: ID 730105
19 EU funded partners
Duration: 2016.12.01– 2020.11.30.
Total budget: 7,000,000.00 EUR



AIM→ Efficient exploitation of EU high concentration scandium containing resources including bauxite residues and acid wastes from TiO_2 pigment production to develop a stable and secure EU scandium supply chain.

Development of innovative extraction, separation, refining and alloying technologies –
Validation in laboratory and bench scale environment

BME → the sustainability assessment of the developed technologies

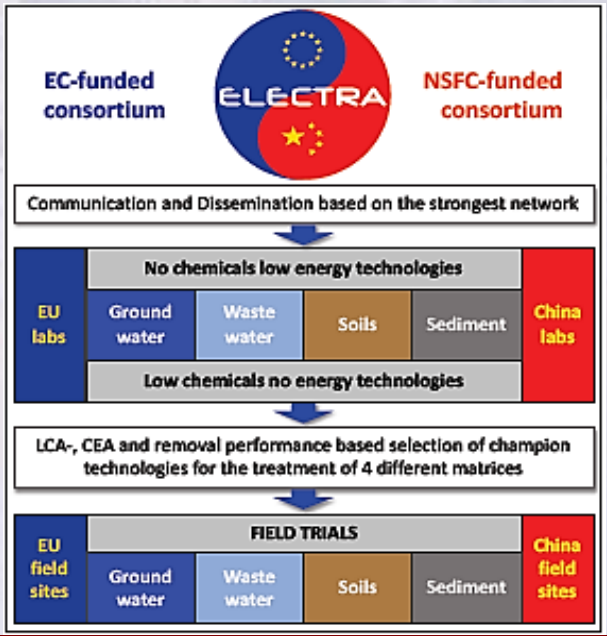
- Biological and ecotoxicological characterization of chemicals used
- Life Cycle Analysis analysis of technologies

„ELECTRA" – ELECTRICITY DRIVEN LOW ENERGY AND CHEMICAL INPUT TECHNOLOGY FOR ACCELERATED BIOREMEDIATION

EU-China RIA initiative | H2020 project GA 826244
CE-BIOTEC-04-2018
Duration: 2019.01.01 – 2022.12.31
Total budget: 4.995.056,25 EUR
https://www.electra.site/

17 EU-funded partners
5 NSFC-funded partner

ELECTRA 生物电



AIM → development and application of highly innovative bio-electrochemical systems-based remediation biotechnologies at laboratory scale → bring the four most efficient technologies to the field in both China and Europe.

ELECTRA will lift bio-electrochemical systems to a next level for field applications and in-situ remediation of pollutants.

BME → development of a problem-specific complex methodology for technology monitoring and evaluation

- Ecotoxicological monitoring of the technologies
- Life Cycle Assessment of the technologies to estimate environmental impacts

Difficulties with H2020
Low success rate

- It is hard to come by with dominant industrial participants (those universities embedded into developed industrial environment are better assets to a consortium)
- For small labs with valuable skills and expertise but with limited industrial network is difficult (if not impossible) to obtain funding
- The stress on applied research and on industrial focus limits the room for applications in the domain of basic research resulting in an increasingly tough competition (universities with basic research skills are handicapped).
- Not only the excellence determines the outcome but the successful partnerships.
- The description of the calls are too general which makes it hard to identify what is the specific aim which helps the proposal win.
- More balanced representation of research topics is needed.

HORIZON EUROPE for the BME

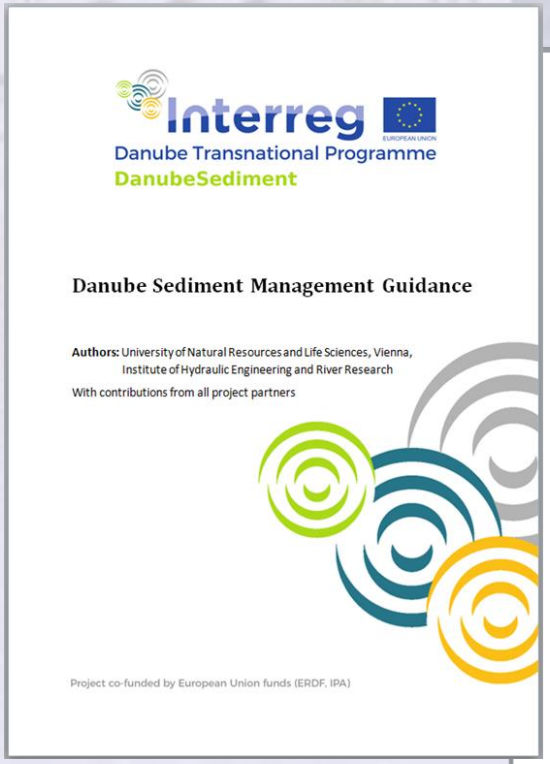
- Mission oriented approach – more focused research and innovation (SDGs, cimate, competitiveness, etc.)
- Universities as leaders in the innovation ecosystem – spreading excellence
- Strong open science policy
- Administrative simplification of project management both at European and national level
- Synchronization between international and national support actions
- Competition of researchers and innovators on the international scale boosting national and institutional collaborations and excellence
- BME has existing and well-established networks, that can be applied continuously in HE – both with research organizations and industry
- Euratom as specific field for the BME
- Increased involvement of researchers of partner institutions at the BME

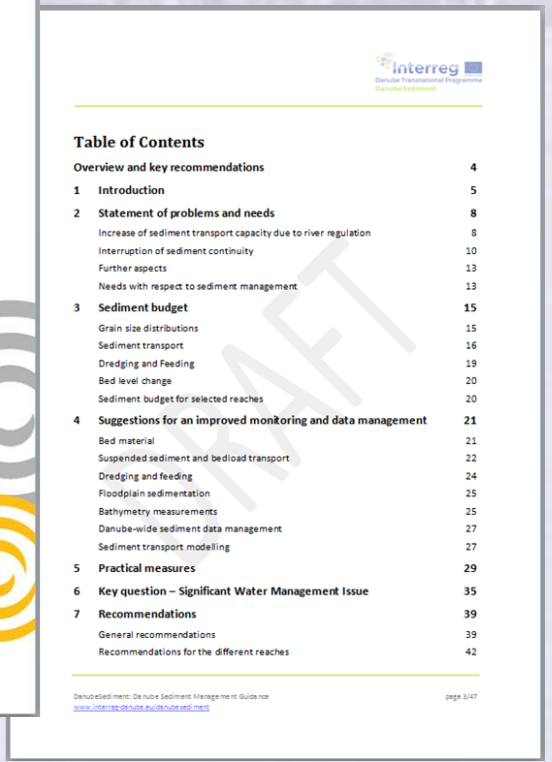
Interreg Danube Transnational Pr.
DanubeSediment project

- 2016-2019
- Lead partner: BME
- Project Budget: 3.56M EUR
- 14 Project Partners from 9 coutries: Germany, Austria, Slovakia, Hungary, Croatia, Slovenia, Serbia, Bulgaria, Romania

Main objectives

- To propose a pragmatic transnational quantitative **sediment monitoring network**
- To establish for the first time the **sediment budget** for the Danube River considering the input of the most important tributaries as well,
- To identify reaches with **surplus and deficit**, river bed aggradation and degradation, **sediment-related problems** in flood risk management, hydropower generation, navigation, ecology
- To gain **knowledge and** better **understanding** of sediment transport and morphodynamic processes in the Danube River
- To develop a **Danube Sediment Management Guidance** (DSMG) and a related **Sediment Manual for Stakeholders** (SMS)

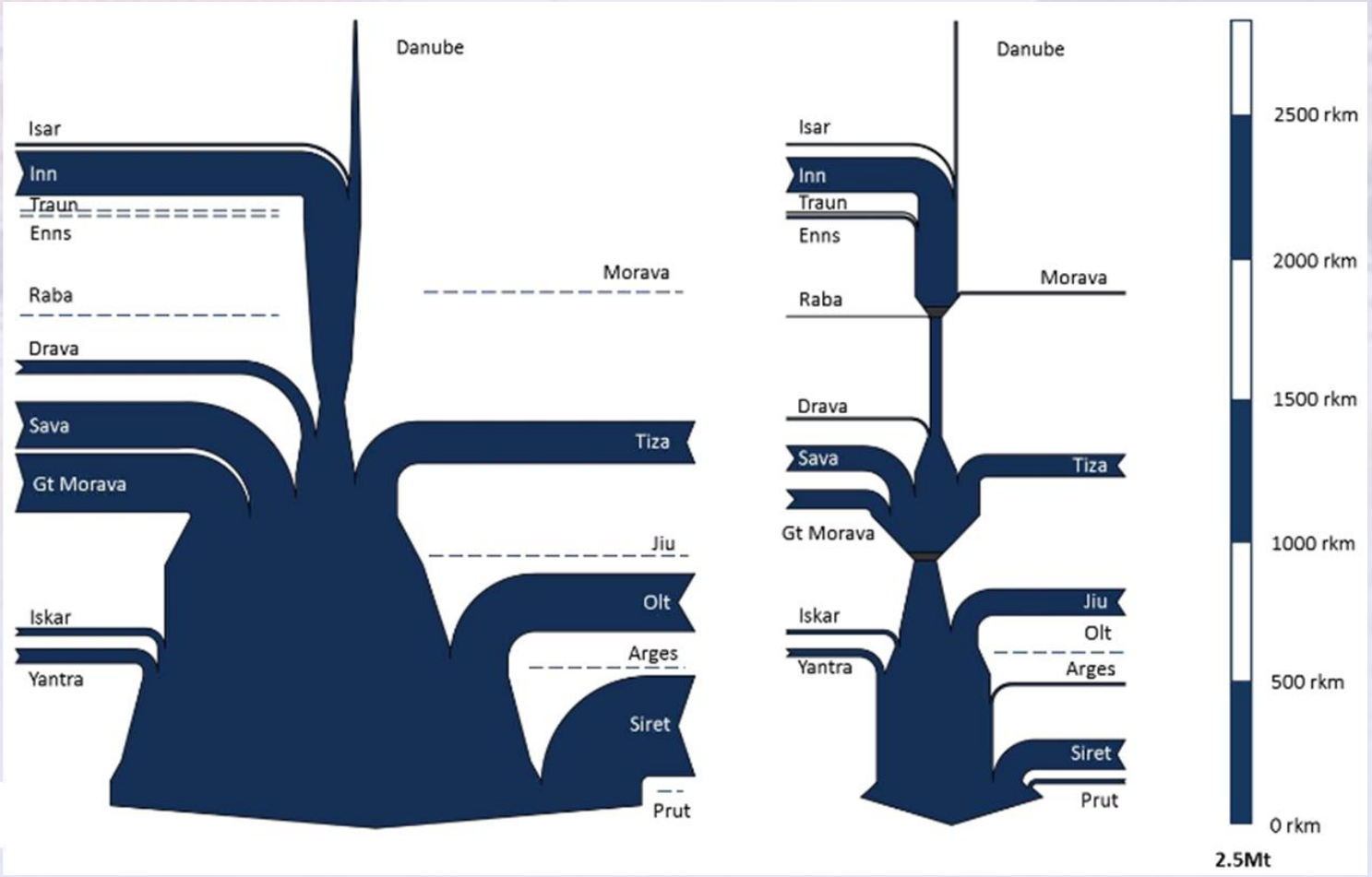




Change in suspended sediment load

Before HPP construction

After HPP construction



Reduction around 60%

Thank you for your attention!

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